TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORTS
OF
SEISMOLOGY AND PHYSICS OF THE EARTH’S INTERIOR
COMMISSION
OF TURKEY
FOR 2007 - 2011

to be presented at the XXV. GENERAL ASSEMBLY of the INTERNATIONAL UNION of GEODESY and GEOPHYSICS JUNE 28 - JULY 07, 2011

ADHERING ORGANIZATION

REPUBLIC OF TURKEY
PRIME MINISTRY
DISASTER AND EMERGENCY MANAGEMENT PRESIDENCY
EARTHQUAKE DEPARTMENT
(AFAD)
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<td>j. Yıldız Technical University Natural Sciences Research Center, İstanbul</td>
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<td>1</td>
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</tbody>
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1. Kocaeli University Faculty Of Engineering Department Of Geophysics, Kocaeli

m. Karadeniz Tecnic University Faculty Of Engineering Department Of Geophysics, Trabzon

n. Kahramanmaraş Sütçü İmam University Faculty Of Engineering Department Of Geology, Kahramanmaraş

o. General Directorate of Mineral Research and Exploration (MTA), Ankara

p. Tübitak Mam Earth And Marine Sciences Institute, Gebze

r. Cumhuriyet University, Geophysical Engineering Department, Sivas

s. Hacettepe University Faculty Of Engineering Department Of Geology, Ankara

t. İstanbul Technical University, Faculty of Mines, Geophysical Engineering Department, İstanbul

u. Middle East Technical University Disaster Management Implementation And Research Center, Ankara

v. Fırat University Faculty Of Engineering Geological Engineering, Elazığ

w. Atatürk University
1. INTRODUCTION

The Turkish National Commission for the Seismology and Physics of the Earth’s interior, being one of the commission of Turkish National Union of Geodesy and Geophysics, is authorized to coordinate the research activities on related topics as well as participate for improvement of activities in these fields. The commission composed of personnel and institutional members coming from the public research organizations and universities.

The chairmanship and the secretariat of the commission, in accordance with the organisational and operational by-laws of Turkish Geodesy-Geophysics Union, are carried out by the Prime Ministry, Disaster and Emergency Management Presidency Earthquake Department.

This report includes summary of the activities of the organisations which provide members to the commission for the years between 2007 and 2011.

2. ACTIVITIES OF THE RESEARCH INSTITUTIONS AND UNIVERSITIES

a. DISASTER AND EMERGENCY MANAGEMENT PRESIDENCY, ANKARA

http://www.afad.gov.tr

http://www.deprem.gov.tr
Turkey changed her disaster management structure in 2009 by merging previously responsible 3 actor. The new organisation is established under Prime Ministry and called Disaster and Emergency Management Presidency (AFAD).

AFAD is responsible from implementing and coordinating:
- pre-disaster works such as preparedness, mitigation and risk management,
- syn-disaster works such as response, emergency aid,
- post disaster works such as recovery and reconstruction.

- Law No: 5902
- Enacted by TNGA 29.05.2009
- Promulgated 17.06.2009
- This new law describes the necessary administrational structure, its activities, responsibilities, relations with other units, and running of tasks related to disaster and emergency management of natural, technological and human originated hazards
- This law aims;
  - To take necessary precautions and measurements on disaster and civil protection related services at country level,
  - To maintain coordination amongst the organisations those have a role pre and post disaster activities,
  - Policy making and implementation on disaster management
Observation studies along North Anatolian Fault System have been carried out since 1990 by continuous and online data acquisition. Especially since 2000, earthquakes occurred in the country have been observed continuously on real-time basis. A high quality data has been provided by broad band stations of DDA (Disaster and Emergency Management Presidency, Earthquake Department). Data presentation and revision of database studies were completed in December 2008. Communication from the stations are provided by Satellite, GPRS, ADSL and Leased Line (Table 1).

As of March 2011; 176 Broad-Band stations, 2 Three Component Short Period, 7 One Component Short Period stations (Fig-1) have been operated by Earthquake Department. In addition to 185 stations, it is planned to establish 20 broad-band stations (Fig-2) until the end of 2011. All of the stations transmit continuously their signal to the Earthquake Department seismic data center in Ankara. Capability of the network is to determine an earthquake which is minimum local magnitude $ML=2.8$ generally, in some region local magnitude threshold is $ML=1.5$. The places where the stations are concentrated. Earthquake activity in Turkey and surrounding region has been observed 7 days / 24 hours, in Earthquake Department data center in Ankara (detail info: http://www.deprem.gov.tr). In addition to the manual solutions; automatic solutions programs are used for the solutions of earthquake as Earthworm and Seiscomp3 (Fig-3). After the manual location of an earthquake, if the earthquake magnitude is over 4.0, system sends to SMS (message) automatically to the authorized people deal with it (such as public and national local crisis center) and inform immediately scientific institutions, press, public and national-local crisis center by fax and e-mail (Fig-4). Data exchange has been carried out EMSC-CSEM. Besides focal mechanism solution (according to P wave first motion), moment tensor solution are done and this solutions are sent to CSEM.

Disaster and Emergency Management Presidency is a official authority in Turkey about where all real-time data recorded (weak and strong motion) at existent station in Turkey is collected, stored, archived and shared with all users.

Specification of the System:

The data are provided by Scream or Earthworm in real-time.
Data format (SUD, SAC, miniSEED).
Request methods (FTP).
Continuous data, Data acquisition format GCF.
Archiving (Scream and Earthworm for waveform data).
MSSQL for bulletin and catalog.
Table 1. Stations According to Types of Communication.

<table>
<thead>
<tr>
<th>Communication Type</th>
<th>Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satellite</td>
<td>84</td>
</tr>
<tr>
<td>GPRS</td>
<td>80</td>
</tr>
<tr>
<td>ADSL</td>
<td>12</td>
</tr>
<tr>
<td>Leased Line</td>
<td>9</td>
</tr>
</tbody>
</table>

Fig-1. National Seismological Observation Network of Turkey.
Fig-2. Approximate location of 20 New Broad-Band Stations (Planned to be established in 2011).

Fig-3. Determination of Earthquake Parameter.
Fig-4. Data Processing System.

PROJECTS

- **Development Of The National Seismological Observation Network Project (Usag)**

  In order to mitigate disaster losses, it is necessary to establish an effective disaster management and risk system. The first step of the management is constituted by preparedness studies before the earthquake (disaster). In order to determine disaster and risk information it is necessary to have a seismological observation network. Due to the monitoring earthquakes in the country wide scale, recording, evaluation and archiving and after a probably destructive earthquake inform the public authority immediately, a project named “Development of the National Seismic Network Project” has been started in 2004. This Project has been supported by State Planning Organization.

- **Multi - Disciplinary Earthquake Researches In High Risk Regions Of Turkey Representing Different Tectonic Regimes Project (Turdep)**

  For earthquake hazard reduction, it is aimed to observe earthquake activity and earthquake precursors by multidisciplinary studies related to the three main fault zones in our country and to introduce the earthquake hazard seriously in the regions under risk (Fig-5). Thus, a database information will be obtained for a disaster management system in the international standards. 14 universities participate in this project which is supported by TÜBİTAK Marmara Research Center (http://www.mam.gov.tr/eng/institutes/ydbe/ydbeprojeler/turdep2009.html).
  Although this project completed on October 2010, it is planned to further developed it in the next years.
Fig-5. Locations of the established and continuously run monitoring stations under the scope of the project. Abbreviations are MR, Marmara region; AEP, Aegean Extensional Province; EAFS, East Anatolian Fault System; NAFS, North Anatolian Fault System; ZBSZ, Zagros-Bitlis suture zone. Arrowhead points to the epicenter of the Izmit earthquake of 17 August 1999.

**Benefits of the Project**

- Investigate the causes of earthquakes,
- Determine the origin time, magnitude, location and depth of earthquakes,
- Observe all active faults,
- Study on earthquake hazard and risk analysis,
- Determine the reoccurrence period of the earthquakes,
- Study on the earthquake prediction research,
- Prepare hazard maps and to direct Emergent Aid System,
- Prepare bulletins, earthquake catalogs and archive data,
- Constitute data base for the earthquake information system,
- Inform immediately scientific institutions, press, public and national-local crisis center,
- Improve earthquake resistant building techniques,
- Provide the utilization of the network as Early Warning System at the places which have strategically importance.

**Turkey Earthquake Data Center Project**

With this project, it is aimed to be center where all real-time data recorded (weak and strong motion) at existent station that have been operated by AFAD, another universities and institutions in Turkey is collected, stored achieved and shared with all users (Fig-6). Disaster and Emergency Management Presidency
(AFAD) is an official authority to perform and coordinate all kinds of scientific studies in the matter of earthquake in Turkey. This Project has been supported by State Planning Organization. Project duration: 2011-2014.

**ACTIVITIES IN THE FIELD OF SEISMOLOGY**

- Host a **International Training Course on Seismology, Seismic Data Analysis, Hazard Assessment and Risk Mitigation, (September 20 to October 22, 2010)** Organised and sponsored by Helmholtz Centre Potsdam, GFZ German Research Center for Geosciences, Kandilli Observatory and Earthquake Research Institute, İstanbul, Tübitak Marmara Research Center, Gebze, Kocaeli University, Izmit, Prime Ministry - Disaster and Emergency Management Presidency, Ankara, Dokuz Eylül University, Izmir.

- “Seismic Data Analysis Course” Tokyo-JAPAN (in accordance with protocol between JICA, Prime Ministry Disaster and Emergency Management Presidency, Bosphorus University, Kandilli Observatory). It started 2010 and will continue until 2012.

- National Cooperation

<table>
<thead>
<tr>
<th>INSTITUTION NAME</th>
<th>STATION NUMBER</th>
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<tr>
<td>Antalya Governorship</td>
<td>2</td>
</tr>
<tr>
<td><strong>Bosphorus University</strong> Kandilli Observatory and Earthquake Research Institute (KOERI)</td>
<td>10</td>
</tr>
<tr>
<td>Çankırı Governorship</td>
<td>1</td>
</tr>
</tbody>
</table>
International Cooperation
- M> 3 earthquakes solution are sent to CSEM automatically
- Online Station Data are sent to ORFEUS
- Catalog Data are sent to ISC
- Data Exchange has been carried out IRIS
- ANTO Station (It belongs to USGS) has been operated from ERD
- Data Exchange has been carried out Georgia Sesimological Center (only 4 station)

PUBLICATIONS


- 8 Mart 2010 ELAZIĞ DEPREMLERİ Değerlendirme Raporu (Ed.:Dr.N.Yılmaz ve T.Uran), Rapor No: 025.343/6056, Ankara, 1 Mayıs 2010.

- Onur Tan, M. Cengiz Tapırdamaz, Semih Ergintav, Sedat İnan, Yıldız İravul, Ruhi Saatçilar, Bekir Tüzel, Adil Tarancıoğlu, Salih Karakısa, Recai F. Kartal, Sami Zünbül, Kenan Yanık, Mehmet Kaplan, Fuat Şaroğlu, Ali Koçyiğit, Erhan Altunel,
The National Strong Motion Network of Turkey (TR-KYH) was established in 1973. This network has been operated by the Republic of Turkey Prime Ministry Disaster Emergency Management Presidency Earthquake Department since December 2009. The national network have been operated only by TR-KYH in the country-wide scale.

The aim of the Network has the primary responsibility for recording each damaging earthquake in the Turkey on the ground and structures in active fault zone and densely urbanized areas to improve public earthquake safety. The TR-KYH maintains national network, data center, and a supporting strong-motion data analyses and research center in support of this responsibility. In addition, fundamental for earthquake engineering studies such as advanced structural analyses, seismic hazard evaluation, site effects and calibration of ground motion attenuation relationships. The accelerometers are mostly installed on the North Anatolian Fault Zone (NAFZ), East Anatolian Fault Zone (EAFZ) and Aegean Graben System where the big earthquakes occurred or the expected active areas with a distance about 50-80 km. Currently, there are 5 different models and total number of 305 digital accelerometers (Figure1,2). The instruments are placed inside institutional buildings such as meteorology stations or local ministerial offices for safety and ease of maintenance. These instruments are installed as free fields.

Initially, analog acceleration records were installed as they were the then-available technology. After 1993, also digital accelerometers were added to the Network. Since 1993, a world standard and real time Strong Motion Network that has high quality data has been achieved by increasing the number of stations rapidly. At the end of 2011, it is aimed to have 450 stations in the network. Furthermore, total station number will be 1000 in the network until 2023.

Since the establishment of the Network, acceleration data of earthquake, which is occurred in Turkey are collected, stored and always updated. To date, KYH was recorded more than 5000 earthquakes’ acceleration records that are presented through Internet (http://kyh.deprem.gov.tr) to all researchers and scientific areas.
Figure 1. Types of Accelerometers and distribution of the number.

Figure 2. National Strong-Motion Network of Turkey.

LOCAL NETWORKS

For observing the seismicity of our country, local networks established with specific geometrical arrays on active fault zones. The aim of this local Networks are, physics of the fracture, the distribution of destructive waves, earthquake and site-building relation in urban and regional scale, secure zones for secure buildings, knowing the
spectral characteristic of the earthquake and development of more reliable attenuation relationships.

There are 8 networks (Figure 3) within TR-KYH that are BYTNet (20) between Bursa-Yalova, DATNet (17) between Denizli-Aydin, MATNet (23) between K.Maraş-Gaziantep-Hatay-Osmaniye, ANANet (15) in Eskişehir, DÜZNet (8) in Düzce, Antalya ANTNet (11) in Antalya, KOCNet (14) in Kocaeli and İZMİRNet (27) in İzmir (Figure 4).

Figure 3. Local Networks map of TR-KYH.

Figure 4. Example for local networks; İZMİR-Net
ACCELEROMETER STATIONS AND DATA

Accelerometers are installed on free-field in special constructed containers. Data are transferring to the central Office continuous or trigger mode with communication devices (Dial-up, Internet, ADSL, GPRS/EDGE etc.). Data are submitted to users from the main network after they are processed (Figure 5, 6).

For site selection of stations, first of all the active tectonic lines of our country and the intensity of building for different geological structures, energy, communication, security, environmental noise, transportation etc. are considered.

Figure 5. Data transfer system of TR-KYH

Figure 6. Main Server and Data Process Center.
SITE INVESTIGATION OF STATIONS

The local site condition of stations were obtained by in-situ geotechnical and geophysical surveys. The average shear-wave velocity of the upper 30 m soil layer ($V_{S30}$) obtained at each strong-motion site through multi-channel analysis of surface waves (MASW) was used for describing the pertaining soil classification. (Figure 8).
Figure 8. Site Profile and Site Information Form of a Stations.

DATA FORMAT

Since the establishment of Turkish National Strong Ground Motion data center (1973), it is possible for users to reach all of accelerograms. File names are as follows in an example: Date(yyyyymmdd)+time(hhmmss)+abbreviation of the station (1201)(ex.20030501002704_1201). All data’s of recordings are zipped in ASCII data format as seen in Figure 9. Beneath the header information there are three components of acceleration data like; N-S(North-South), E-W(East-West) and U-D(up-down). Besides sample intervals for each recording could be found beneath the header "SAMPLE INTERVAL".

Records obtained from analog recorders are converted to digital ones by using related software. Time Series obtained from analog and digital instruments weren’t subjected to frequency change and also other processes. For uncorrected data no corrections are implemented. For untreated data only set-off correction process is implemented. All data are acceleration data with unit’s cm/sn² (gal).

![Figure 9. Data Format (ASCII)](image)

```plaintext
DATA FORMAT

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Figure 9. Data Format (ASCII)
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**PROJECTS**

| Enhancement of the National Strong Motion Network and Establishing Seismic Arrays in Turkey  
| (Nato Science For Peace Program – Sfp977484)  
| "BYTNet and DATNet"  
|  
| Establishment of Local Strong Motion Seismic Array  
| "MATNet"  
| (TÜBİTAK İÇTAG-1578/YMAÜ)  
|  
| Establishment of Local Strong Motion Seismic Array  
| "AnaNet"  
| (Project Number: 040302)  
|  
| Compilation of The National Strong Motion Network Database According to International Standart  
| (TUBITAK Project Number :105G016)  

**WEB PAGE AND DATA COMMUNICATION**

All digital acceleration data for all earthquakes from 1976 to date are stored in a data base within [http://kyh.deprem.gov.tr](http://kyh.deprem.gov.tr) that are open to all researchers and scientific areas (Figure 10). Daily strong motion records, Earthquake Reports that are M≥4, Station informations and Maps are always up to date.
PUBLICATIONS


(3) TURKISH – JAPANESE PROJECT

Turkish and Japanese Government have been decided to make a project in order to mitigate disaster loss in Turkey. Because of this purpose an agreement signed between Japan International Cooperation Agency (JICA) and General Directorate of Disaster Affairs in 1993. JICA has been supported the project titled as Earthquake Disaster Prevention Research Project. A research center has been established at Earthquake Research Department (ERD) in Ankara in 1997 to mitigate earthquake risk in Turkey. The aim of the center is to collect earthquake data and make rapid real-time loss estimation for cities located along middle part of the North Anatolian Fault Zone in case of an earthquake. The system that was installed at the Earthquake Data Collection and Vulnerability Evaluation Sub-center (EDCVE) receives seismic wave data automatically which are recorded by velocity type seismometers installed at 10 observing terminals. It then determines hypocenter of earthquake from P and S arrivals by simulating annealing algorithm and calculates moment magnitude (Mw) with the long period seismograms and sends this information via short message service (SMS) and e-mail to the researchers. It also produces Seismic Intensity Distribution and Peak Ground Acceleration maps. Consequently, it estimates casualties, damaged buildings and roads by considering seismic intensity, population and building stock database of the project area.

The system has been developed by the Follow-Up Project which has been supported by Japan International Cooperation Agency (JICA) in 2005 and 2006. In the scope of this project, all the system softwares have been moved from SUN to LINUX and the database from ORACLE to MySQL. Besides, the system has become more user-friendly for the operator and able to estimate disaster loss not only project area but also whole Turkey.

In future, data of nationwide strong ground motion network which are operated by new governmental agency will be linked to the system in order to determine more reliable source location of the earthquakes.

The project targets of EDCVE Sub-center are as follow;

a) To determine the earthquakes parameters and making a pre-estimation about the human loss and damage just after the earthquake,

b) To provide a reliable data transmission between local stations, the regional and main centers by using a computer network,
c) To evaluate the results and transmit them to administrative organizations in approximately within 20 minutes.

The project service area is located in the central part of the North Anatolian Fault Zone and covers Samsun, Sinop, Kastamonu, Çankırı, Çorum Yozgat, Amasya, Tokat and Ordu provinces. The Earthquake observation system consists of a main center in Ankara and local stations in Amasya, Çankırı, Çorum, Kastamonu, Samsun, Vezirköprü, Tokat, Niksar and Yozgat.

**The system properties are;**

a) Intelligent: aiming at automatic determination of earthquake parameters and estimation of damages,

b) Experimental: for practical utilization of this kind of new approach,

c) Upgradeable: open to developments by using new data and findings.

The main center is now active in Earthquake Research Department, General Directorate of Disaster Affairs in Ankara. It depends on the activities of the subgroups for data collection and evaluation, seismological studies and analysis, data transmission and system control.

Hardware in the main center consist of one workstation for determining the earthquake parameters and estimating the damage distribution, and two PCs and accessories for controlling the system.

![Fig-1. The Stations Map of Turkish – Japanese Project](image-url)
Project Area and Recorded Earthquakes  Seismic Intensity Distribution Map

Peak Ground Acceleration Distribution Map  Building Damage (Stone)

**PUBLICATION**

Suzuki Sadaomi, Takao Kagawa, Murat Beyhan, Engin Coruh, Bekir Tuzel, Mayumi Sakamoto, Yutaka Ohta. Speaker Suzuki Sadaomi, Improvement of the Experimental System in Turkey Automatically Estimating Seismic Source, Ground Motion and Damage, XXIV IUGG General Assembly, 2-13 July 2007, Poster No :SS002/81 Perugia, Italy
Kandilli Observatory was annexed to Boğaziçi University on the basis of cabinet executive order 41 on 28 March 1983 and has acquired an institutional status, namely KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE (KOERI).

From 1868 to today, the development of the Observatory and the researches conducted can be summarized into three important periods: 1868-1909-1911-1982, and from 1982 to the present: an Academic Institute.

After annexed to Boğaziçi University and given an institutional academic status, Kandilli Observatory and Earthquake Research Institute (KOERI) extended its activities into various observational fields with the main emphasis oriented towards earthquake research, education and relevant observational service activities. KOERI today has evolved into a multidisciplinary earthquake research organization providing graduate education in three departments namely Earthquake Engineering, Geophysics and Geodesy. KOERI is a unique organization in Turkey encompassing earthquake observation, research, education and application services within a single, integrated body.

KOERI provides seismological observation services with its continuously expanding network distributed throughout Turkey. Currently, the 50 station network is operational (two stations located in North Cyprus) with on-line, leased-line, radio-link and dial-up connections. The network provides continuous earthquake information to KOERI and this information is quickly forwarded to proper authorities.

About 60 strong motion accelerometers are operated by KOERI in and around Istanbul. A 5 station array has been placed in North Cyprus together with Near East University. The instrumented structures in Istanbul include 2 monuments namely Haghia Sophia Museum and Suleymaniye Mosque and a high-rise building. For aftershock studies and other special projects 12 strong motion instruments are utilized. Preparations are underway for the strong motion instrumentation of several important bridges and dams in Turkey.

Besides this, the Astronomy, Meteorology and Magnetism observatories have been updated with state of art technology.
Figure 1. UDIM (Boğaziçi University Kandilli Observatory and Earthquake Research Institute Earthquake Research Center)

(1) GEOPHYSICS DEPARTMENT

Geophysics department at Boğaziçi University, Kandilli Observatory and Earthquake Research Institute gives the highest priority to original research with the aim of promoting young researchers and scientists reflecting the mobility of the modern science and the fast progress in technology within their research, together with the essential human qualities such as environmental awareness and preservation of the nature, while identifying and providing solutions in the part of the world we are living.

The core elements of the MSc and PhD curriculum at our department provides necessary mathematics and physics background and aiming at educating young researchers in the field seismology with a wide range of topics, such as elastic wave propagation, earthquake source mechanisms, signal processing, strong ground motion and instrumentation.

Investigation of earth’s crust using seismic, electrical, magnetic and electromagnetic methods, engineering seismology, geo-magnetism, paleo-magnetism and
Identification of active faults and understanding related lithospheric forces, seismicity, seismic hazard and risk; landslide and avalanche studies; industrial raw material; mine, underground water, oil and natural gas prospection studies; soil investigations for various sizes of engineering structures; the composition of the Earth’s interior and crust and their physical properties are among the department’s fields of interest.

**PROJECTS**

<table>
<thead>
<tr>
<th>Name of the Project</th>
<th>Advisor</th>
<th>Start Time</th>
</tr>
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<tbody>
<tr>
<td>Mikro Depremler ile Fay Direncinin Araştırılması</td>
<td>Prof. Dr. Mustafa AKTAR</td>
<td>2009 (BAP)</td>
</tr>
<tr>
<td>PIRESS</td>
<td>Prof. Dr. Mustafa AKTAR</td>
<td>2007 (GFZ, Potsdam)</td>
</tr>
<tr>
<td>Kıbrıs yayının yapısı ve Dinamiği</td>
<td>Prof. Dr. Cemil GÜRBÜZ</td>
<td>2009 (GFZ, Potsdam)</td>
</tr>
<tr>
<td>Doğu Marmara Bölgesinin Sismik Hız Yapısını Yerel Tomografi Yöntemi İle Araştırılması</td>
<td>Prof. Dr. Cemil GÜRBÜZ</td>
<td>2007 (BAP)</td>
</tr>
<tr>
<td>Aydın İl, Köşk İçesi , Salâvatlı Jeotermal Sahası Mikro-Deprem Aktivitesi</td>
<td>Prof. Dr. Cemil GÜRBÜZ</td>
<td>2010</td>
</tr>
<tr>
<td>Installation of Seabottom Observatories in the Marmara Sea</td>
<td>Prof. Dr. Cemil GÜRBÜZ</td>
<td>2010 (TurkTelekom)</td>
</tr>
<tr>
<td>SIMBAAD (Seismic Imaging of the Mantle Across the Aegean-Anatolian Domain)</td>
<td>Prof. Dr. Hayrullah KARABULUT</td>
<td>2008 (LGIT-Fransa)</td>
</tr>
<tr>
<td>Türkiye ve Çevresinin Hız Yapısının Pasif</td>
<td>Prof. Dr. Hayrullah</td>
<td>2010 (Tübitak)</td>
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<td>Name of the Project</td>
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<tr>
<td>Görüntüleme Yöntemi ile Belirlenmesi</td>
<td>Prof. Dr. Hayrullah</td>
<td>2008 (LGIT-Fransa)</td>
</tr>
<tr>
<td>Monitoring the seismicity in the Çınarcık Basin</td>
<td>Prof. Dr. Hayrullah</td>
<td>2008 (LGIT-Fransa)</td>
</tr>
<tr>
<td>Seismotectonics and crustal structure of Antalya Bay and Cyprian Arc</td>
<td>Prof. Dr. Hayrullah</td>
<td>2010</td>
</tr>
<tr>
<td>KuzeyAnadolu Fay Zonu’nun Kuzeybatı Ucu (GanosFayı) Kabuk ve Üst Manto Yapısının Lokal Tomografi ve Receiver Function Yöntemleriyle Saptanması</td>
<td>Prof. Dr. Niyazi</td>
<td>2010</td>
</tr>
<tr>
<td>Gübeybatı Anadolu ve Çevresindeki Üç Boyutlu Litosferik Yapının “Yüzey Dalgaları Tomografisi” ve “Ambient Noise Correlation” Yöntemleriyle Saptanması</td>
<td>Prof. Dr. Niyazi</td>
<td>2010 (BAP)</td>
</tr>
<tr>
<td>Caucasus Seismic Emergency Respons</td>
<td>Prof. Dr. Niyazi</td>
<td>2008 (NATO)</td>
</tr>
<tr>
<td>Sismik Izlerin Vektörelleştirilerek Sayısallaştırılması</td>
<td>Doç. Dr. Nurcan Meral</td>
<td>2009</td>
</tr>
<tr>
<td>Türkiye’nin Deprem Riski Yüksek Jeo-Stratejik – Ancak Tektonik Rejimleri Farklı-Bölgelerinde Deprem Davranışlarının Çok Disiplinli Yaklaşmlarla Araştırılması</td>
<td>Doç. Dr. Nurcan Meral</td>
<td>2006 (Tübitak)</td>
</tr>
<tr>
<td>EUROSEİSMOS Project, Saving and Studying the Seismograms of the Strongest Euro-Mediterranean Earthquakes</td>
<td>Doç. Dr. Nurcan Meral</td>
<td>2005</td>
</tr>
<tr>
<td>Bölgesel Tsunami İzleme ve Değerlendirme Merkezi Projesi</td>
<td>Doç. Dr. Nurcan Meral</td>
<td>2009 (DPT)</td>
</tr>
<tr>
<td>Collaborative, Complex and Critical Decision-support in Evolving Crises (TRIDEC)</td>
<td>Doç. Dr. Nurcan Meral</td>
<td>2010 (NATO)</td>
</tr>
</tbody>
</table>
PUBLICATIONS

A Bayesian Deconvolution Approach for Receiver Function Analysis
Author(s): Yildirim S, Cemgil AT, Aktar M, et al.
Source: IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING Volume: 48 Issue: 12 Pages: 4151-4163 Published: DEC 2010

Faulting characteristics of supershear earthquakes
Author(s): Bouchon M, Karabulut H, Bouin MP, et al.
Source: TECTONOPHYSICS Volume: 493 Issue: 3-4 Special Issue: Sp. Iss. SI Pages: 244-253 Published: OCT 18 2010

Stress interactions of three moderate size earthquakes in Afyon, southwestern Turkey
Author(s): AksariD, KarabulutH, OzalaybeyS
Source: TECTONOPHYSICS Volume: 485 Issue: 1-4 Pages: 141-153 Published: APR 1 2010

Love-wave group velocity maps of Turkey and surrounding regions
Author(s): Cambaz MD, Karabulut H
Source: GEOPHYSICAL JOURNAL INTERNATIONAL Volume: 181 Issue: 1 Pages: 502-520 Published: APR 2010

Bala (Ankara) Earthquakes: Implications for Shallow Crustal Deformation in Central Anatolian Section of the Anatolian Platelet (Turkey)
Author(s): Tan O, Tapirdamaz MC, Ergintav S, Ozel NM, et al.
Source: TURKISH JOURNAL OF EARTH SCIENCES Volume: 19 Issue: 4 Pages: 449-471 Published: 2010

Microseismicity at the North Anatolian Fault in the Sea of Marmara offshore Istanbul, NWTurkey
Author(s): Bulut F, Bohnhoff M, Ellsworth WL, et al.
Source: JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH Volume: 114 Article Number: B09302 Published: SEP 3 2009

A high-resolution aftershock seismicity image of the 2002 Sultandagi-Cay earthquake (Mw=6.2), Turkey
Author(s): ErginM, AktarM, OzalaybeyS, etal.
Source: JOURNAL OF SEISMOLOGY Volume: 13 Issue: 4 Pages: 633-646 Published: OCT 2009

- 2009 -

- 2008 -
Insight into the crustal structure of the eastern Marmara region, NW Turkey
Author(s): Bekler T, Gurbuz
Source: PURE AND APPLIED GEOPHYSICS Volume: 165 Issue: 2 Pages: 295-309 Published: FEB 2008

A conjugate strike-slip fault system within the extensional tectonics of Western Turkey
Author(s): Aktar M, Karabulut H, Ozalaybey S, et al.
Source: GEOPHYSICAL JOURNAL INTERNATIONAL Volume: 171 Issue: 3 Pages: 1363-1375 Published: DEC 2007

Spatial variability and non-linearity of strong ground motion near a fault
Author(s): Karabulut H, Bouchon M
Source: GEOPHYSICAL JOURNAL INTERNATIONAL Volume: 170 Issue: 1 Pages: 262-274 Published: JUL 2007

Crustal attenuation within the Turkish plateau and surrounding regions
Author(s): Zor E, Sandvol E, Xie JK, Turkelli N, et al.

Comparison of hypocentre parameters of earthquakes in the Aegean region
Author(s): Ozel NM, Shapira A, Harris J

(2) **THE EARTHQUAKE ENGINEERING DEPARTMENT (EED)**

The Earthquake Engineering Department (EED) is a department in Kandilli Observatory and Earthquake Research Institute (KOERI) at Bogazici University (BU) in İstanbul.

Being established in 1868, KOERI (then, Imperial Observatory) has a tradition of science that encompasses the initiation of the formal meteorological observations in 1911 and also the start of the systematic seismological measurements in 1926 in the country. After annexation to Bogazici University (originally founded in 1863 in Istanbul as Robert College), KOERI has evolved into a multidisciplinary earthquake research organization providing graduate education under the Earthquake Engineering, Geophysics and Geodesy departments and encompassing earthquake observation, research and application services within a single, integrated body. The National Earthquake Observation Center of KOERI provides seismological observation services with its continuously expanding network distributed throughout Turkey. Currently, the 102-station network is operational with on-line connections. For the observation of seismicity in Northeast Turkey (Marmara) region
43 stations are used in several network configurations. Other stations, including 13 broadband stations are distributed throughout the country.

EED has started its activities in 1989 as a graduate department under KOERI of BU. The overall mandate of the department is to conduct graduate level training, research and implementation that will contribute to seismically safer structures, systems and environment. The department is the first and only academic unit in Turkey that can provide graduate level training on Earthquake Engineering leading to M.Sc. and Ph.D. degrees in Earthquake Engineering.

Earthquake Engineering can be viewed as a multi-phased process that ranges from the description of earthquake source process to seismic disaster mitigation procedures. Earthquake response analysis of site and structures and the assessment of the strong ground motion that will emanate from an earthquake constitute the two main ingredients of the discipline. The emphasis of our academic activities are placed on: Earthquake hazard and risk analysis; Development of urban earthquake damage scenarios; Characteristics of strong earthquake ground motion; Site and soil response analysis; Earthquake response of buildings, historical monuments, industrial facilities, bridges and dams; Soil-structure interaction; Dynamic testing of small-scale model and prototype structures; Retrofitting and post earthquake strengthening of structures; Damage evaluation and earthquake insurance; and the Development of earthquake resistant design codes.

KOERI-EED has played a leading role in Turkey for the advancement of the earthquake risk mitigation by taking part in the various National Committees (i.e. Turkish National Earthquake Council in the preparation of the report on National Strategies for Mitigating Earthquake Damage) in the nationally funded projects (i.e. Istanbul Metropolitan Municipality Earthquake Master Plan).

The Department of Earthquake Engineering enjoys close ties and exchange of students and faculty with relevant institutions throughout the world. These include several international organisations, university research centers and government establishments.

EED has done pioneering work on many aspects of earthquake engineering, in seismic hazard and risk analysis, earthquake occurrence and ground motion modeling, component and system reliability, experimental research on structures and components, evaluation of damage potential of ground motions, and development of seismic design methodologies.

Following is a list of the main research areas at EED:

- Strong Ground Motion
- Earthquake Hazard
- Urban Earthquake Loss
- Seismic Microzonation
- Performance Based Seismic Evaluation and Design
- Earthquake Protection of Cultural Heritage
RESEARCH

Istanbul Early Warning and Rapid Response System

Especially after Kocaeli (1999) earthquake, by taking into consideration the vital importance of Early Warning and (Emergency) Rapid Response, the project prepared by Bogazici University Kandilli Observatory and Earthquake Research Institute, has been realized. The agreement involving Turkish republic and Credit Suisse First Boston in relation to Istanbul Earthquake Early Warning System and Rapid (Emergency) Response project, will be carried on by by Bogazici University Kandilli Observatory and Earthquake Research Institute, has become valid after decree of Council of Minister on 2001 Fiscal Year.

The system is designed and operated by Bogazici University with logistic support of the Governorate of Istanbul, First Army Headquarters and Istanbul Metropolitan Municipality. The construction of the system is realized by the GeoSIG and EWE (Switzerland) consortium. Communications, related only to Rapid Response System, are provided by IS-TIM ARIA GSM service provider.

Early Warning System

Turkey is confronted with the problem of earthquakes. The role of shaking table test is increasingly important in assuring the performance of structures during earthquake. The Department of Earthquake Engineering at Kandilli observatory earthquake engineering research institute of Bogazici University has recently acquired two shake table facilities to conduct experimentation in structural dynamics and particularly how to monitor and actively control structures subjected to earthquake ground motions or other force excitations. The central feature of the new established Shaking laboratory is an advanced, closed-loop, servo-controlled electro-hydraulic seismic simulator or shake table. This high performance seismic simulator can accurately reproduce earthquake ground motions and a variety of other input wave forms, and can configured for wide range of testing applications. It can be used for seismic research and qualification testing of equipment, structural components and scale models. Since the experimental research is an important factor in the developing of the construction industry of Turkey the shaking table Laboratory has been equipped with the most contemporary devices and has become a laboratory of research in order to improve technology in every field of structural and earthquake engineering.

PROJECTS

European Union (EU) Project

EU- FP5 LESSLOSS

(2004 - 2007 )

(http://www.lessloss.org/main/index.php?option=com_frontpage&Itemid=52),
EU – FP6 PREVIEW – Prevention, Information and Early Warning
(2005 - 2008)
(http://www.preview-risk.com/site/FO/scripts/myFO_accueil.php?lang=EN),

EU – FP6 NERIES – Network of Research Infrastructures for European Seismology
(2006 – 2010)
(http://www.neries-eu.org/),

EU – FP6 TRIPOD – Training Civil Engineers in post-earthquake assessment of damaged buildings
(2006 – 2008)
(http://tripod.cti.gr/),

EU – FP6 TRANSFER-Tsunami Risk And Strategies For The European Region
(2006 – 2009)
(http://labtinti4.df.unibo.it/transfer)

EU – FP6 SAFER – Seismic Early Warning for Europe
(2006 – 2009)
(http://www.saferproject.net/doc/workpackages.htm),

EU – FP7 SHARE – Seismic Hazard Harmonization in Europe
(2009 – 2012)
(http://www.share-eu.org/)

EU – FP7 NERA – Network of European Research Infrastructures for Earthquake Risk Assessment and Mitigation
(2010 – 2014)

EU – FP7 TRICDEC – Collaborative, Complex and Critical Decision- Support in Evolving Crises
(2010 - 2013)
(http://tridec.gfz-potsdam.de/),

EU – FP7 SERIES – Seismic Engineering Research Infrastructures for European Synergies (2010 - 2014)
(http://www.series.upatras.gr/),

**NATO Project**

Seismic Hazard and Risk Assessment for Southern Caucasus-Eastern Turkey Energy Corridors (SHRAP). SFP 983038

Global Earthquake Model (GEM)

- Global Earthquake Model (GEM) [http://www.globalearthquakemodel.org](http://www.globalearthquakemodel.org)


**Tubitak and BAP Projects**

Simulation of Design Basis Ground Motion for Istanbul

Prediction of the Missed Component of the 17 August 1999 Kocaeli Earthquake

Assessment of Strong Ground Motion in İstanbul and Code Based Provisions for Near Field Earthquakes

**PUBLICATIONS**

B. Yağcı, A. Ansal, "Microzonation study in Balıkesir", Teknik Dergi, 20, 1, 4583-4607, 2009. SCIE


• Yağcı, A. Ansal (2008)“Mikrobölgeleme için yapay ve gerçek ivme kayıtlarının kullanımı”, İTÜ Dergisi Mühendislik


• Durukal, M. Erdik, Z. Cagnan, K. Sesetyan, Istanbul Earthquake: Issues with the Compulsory Insurance, Natural Hazards Review, ASCE (Submitted, 2008)

• M. Erdik, E. Durukal, N. Ertürk, B. Sungay, Earthquake Risk Mitigation in Istanbul Museums, Natural Hazards, (Submitted, 2008)

• M. Erdik, H. Keypour, E. Durukal, Assessment of the Earthquake Response of Hagia Sophia, Gesellschaft für Gregorianik-Forschung e.V. Germany (submitted, 2008).


• S.Altun, A.B.Göktepe, A.Ansal, C.Akgüner (2008) “Simulation of torsional shear test results with neuro-fuzzy control system” Soil Dynamics and Earthquake Engineering, online

• Ansal, A. Akinci, G. Cultrera, M. Erdik, V. Pessina, G. Tönük, G. Ameri (2008) “Loss estimation in Istanbul based on deterministic earthquake scenarios of the Marmara Sea region (Turkey)” Soil Dynamics and Earthquake Engineering, online


• Durukal E., M. Erdik, Z. Cagnan, K. Sesetyan, Istanbul Earthquake: Issues with the Compulsory Insurance, Natural Hazards Review, ASCE (Submitted, 2008) •
Erdik M., E. Durukal, N. Ertürk, B. Sungay, Earthquake Risk Mitigation in Istanbul Museums, Natural Hazards, (Submitted, 2008)


• Yağcı, A. Ansal (2008) “Mikrobölgeleme için yapay ve gerçek ivme kayıtlarının kullanılması”, İTÜ Dergisi Mühendislik


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c. ANKARA UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSIC

http://geop.eng.ankara.edu.tr

ANKARA UNIVERSITY EARTHQUAKE RESEARCH AND APPLICATION CENTRE (ADAUM)

Earthquake Research and Application Centre (ADAUM) were founded in 2003 to establish and expand seismological networks for earthquake observation, re-processing of national data, and detailed research on Seismology, Engineering Geology and Geophysics, regulate related scientific, educational and practical activities. The management and advisory board of the Centre were organized from
different branches of science such as Geophysics, Geology, Agriculture, Law and Education departments of Ankara University. The Centre completed two national projects; the total budget of the projects was about five million dollars and has been started two new projects in 6-years period. Centre has published a number of international and national scientific papers and reports in the last two years. In addition to scientific activities within the scope of the earthquake, the centre gives special attention to issues directly related to human life such as measurement and calculation of earthquake resistant design parameters, modelling the dynamic behaviour of soils especially in urban sites. For this purpose, the Centre organises the ongoing independent researches on earthquakes and related fields to make them certain projects under directing the scientific and societal goals.

**PUBLICATIONS**


2. Dikmen Ü., Arisoy M.Ö. and Akkaya İ., 2010 Offset and linear spread geometry in the MASW method, Journal of Geophysics and Engineering (special issue on Near Surface Geophysics for the study and the management of historical resources), 7(2), 211-222


**International Congress/Conference**


**Book/Book Chapter**

Ahmet Tuğrul Başokur, Ergün Gökten, Baki Varol, Begüm Civgün, Recep Kılıç, Koray Ulamış, Ünal Dikmen, İrfan Akca, N.Yıldırım Gündoğdu 2010, Ankara
PROJECTS

Survey Reports and Projects

Completed projects:

1. A new Technique in prediction of dynamic soil behaviour under an Earthquake: Application to aluvial plains in western part of Ankara-Turkey (BAP, 2005-07-45-029)

2. Investigation the Crust structure of North Anatolia by Geophysical Survey Methods (TUBITAK, 105G145)

Ongoing projects:

3. Water Content Determination and Geotechnical Applications by means of multi-parameter dataset (BAP, No: 11B6055001)

4. What is an Earthquake? Raising awareness of elementary and high school students (BAP, 2011)

d. ANADOLU UNIVERSITY SPACE AND SATELLITE RESEARCH INSTITUTE

http://www.uube.anadolu.edu.tr

Remote sensing and Geographical Information Systems studies in Anadolu University were started in 1989 in the Computer Center of Anadolu University and formally continued their studies in Space and Satellite Research Institute in 1993. At the end of 1996, Institute was moved to a new campus of Anadolu University called İki Eylül Campus. Recently, Remote Sensing and Geographical Information Technologies, Disaster Management, Space Researches, Distant Education, Earth
System Sciences and Documentation of Cultural Assets Groups’ were established in the Institute. These groups carry out several research projects in collaboration with the academic units of Anadolu University, other universities, and several public foundations like Governor of Eskişehir, Disaster and Emergency Management Department, Municipalities, besides their own projects.

**Tasks on the Construction and Operation of a Local Seismic Network**

**Purpose:**
Solution to earthquake locations and production of tremor maps, providing of local earthquake solving capability to the City Disaster and Emergency Management Directorate.

**Context:**
Building, operating and real time data transferring infrastructure of 12 accelerometer and 6 seismometer stations.

Map showing locations of the earthquake recording stations of Anadolu University.

**Seismic Studies**

**Purpose:**
One of the main topics of earthquake researches is the use of seismic reflection studies to determine the fault locations. While researching the faults, studies based on surface geology fails in alluvial area. Although trench digging may provide some solutions, it is time consuming, tedious and difficult. Under this circumstances, geophysical methods are implemented. Among various geophysical technics, the best method to image the faults is the seismic reflection method. To determine the faults, multi-channel seismic reflection technics are widely used.
**Context:**

Presently, an important fault, threatening Eskisehir City, and cannot be observed by surface geological researches, is determined via seismic reflection method, and trench digging stage is reached. The knowledge and experiences obtained in Eskisehir City are transferred to Bolu City. Similar studies will be implemented to Zonguldak City. Besides earthquake researches, tasks to explore subsurface resources (geothermal and coal) are about to begin.

**The Study Of Determining Structural Properties**

**Purpose:**

Developing the method of inventory information collection and building scoring for existing building stock and new buildings that are appropriate to Turkish Construction Specifications utilizing technologies of Information System.

**Context:**

Pilot study area that has dense housing and high vulnerability risk due to the structural defects and soil defects.

In order to generate the information of building inventory, a new building assessment form was developed imitating the DUR-TES Method that were conducted by Department of Civil Engineering of Istanbul University in Bakirkoy region. Eight district in Tepebasi region that has alluvial soil properties, densely populated and a large part of total building stock was determined as a pilot region of the study. 1100 multi-storey (four and above) buildings were examined by the rapid assessment methodology.

There are various queries such as general, load bearing system and material properties of the building in the assessment form. In the first phase of the study, project drawing of the buildings were examined and buildings were examined on-site in the second phase.

**Tasks on the Determination of the Soil Properties**

**Purpose:**

Determination of the soil structure (soil type and soil parameters) in densely populated areas and researches on the risks related local soil conditions.

**Context:**
Under the scope of the research projects previously completed by the State Water Works Local Directorate, re-evaluation of drilling data, in case it is needed, 30 m and 100 m depth drilling, cone penetration taste (CPT), microtermor measurements will be achieved by the local municipalities in the center of the Eskisehir City.

Microtremor measurements in 286 different stations were obtained during 45 minutes in average with single-station microtremor. Tasks were conducted to determine horizontal to vertical amplitude amplification ratio of the soil dominant tremor frequency.

**Tasks on the Geographical Information Systems:**

**Purpose:**

In disaster management, to build the coordination among institutions, an understanding of coordination comprising the priorities, the cooperated work principles, performance evaluations and development of coordination rules must be achieved.

**Context:**

An information system should be developed to produce a reliable an updated fast data flow to the coordination center, means to start tasks for developing basic information system to start implementations.

**Contribution to Public Activities:**

**Purpose:**

Recently recruited personnel of City Disaster and Emergency Management Directorate were trained.

**Context:**

The protocol signed between Anadolu University and City Disaster and Emergency Management Directorate provides both institutes a join work area to determine the disaster risks and disaster management plans.
Department of Geophysical Engineering founded in Science Faculty of Ege University in 1974, has been continued to its education under the frame of Dokuz Eylul University (DEU) on July 20, 1982. Today, it has been going on its education and research facilities as one of the 11th departments belonging to the Engineering Faculty. It is unique department of Izmir which is 3rd biggest city in the country with its more than 3.5 million inhabitants, and cultural/industrial capital of the Aegean region of Turkey. In addition, our students can be able to find close cooperation with other departments across Tinaztepe Kaynaklar Campus in Buca to develop interdisciplinary approaches for solving engineering and geosciences problems.

Targets of the department are to educate engineers and academicians in applied geophysics, seismology and earth physics by using present instrumental and scientific technologies, to train human resources who investigate underground resources to support national economy, and providing additional support to design structures by detecting site properties especially in the region.

Many graduates of our department are employed in the applied geophysics industry, primarily in exploration of underground resources such as groundwater, geothermal, valuable mines, marine geophysics, hydrocarbons such as petroleum, gas hydrats and natural gas. A significant percentage of our graduates go on to pursue MSc or PhD study before seeking either petroleum or seismology employment. Others working fields are site investigations, environmental problems, earthquake analysis, disaster and hazard mitigation studies. Undergraduate section of the department has MUDEK and EUR-ACE (EURopean ACcredited Engineer) accreditation labels till September 30, 2013.

Education members of our departments have been leading two research centers belonging to the Dokuz Eylul University. These are Earthquake Research and Implementation Center (DAUM), and Center for Near Surface Geophysics and Archaeological Prospection (SAMER). The DAUM aims observing seismic activity in Aegean Region of Turkey while SAMER promotes to seek buried underground
structures close to the surface. Both centers conduct variety of research projects and scientific organizations within the department.

Departmental instrument park, examples of projects for each institution, and of scientific publications in the last 6 years can be found at below table.

**DEPARTMENTAL INSTRUMENT PARK**

24-channel seismic equipments, resistivity, VLF, GPR, SP and micro-gravity instruments

**PROJECTS**

<table>
<thead>
<tr>
<th>Duration</th>
<th>3 years (2008-2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td>Department of Geophysics of the DEU</td>
</tr>
<tr>
<td>Name</td>
<td>Investigation of underground structure of South of Izmir by using micro-gravity and GPS methods</td>
</tr>
<tr>
<td>Support</td>
<td>TUBITAK-CAYDAG (108Y285)</td>
</tr>
<tr>
<td>Aim</td>
<td>Basement topography of Izmir will be investigated by using micro-gravity and GPS campaign measurements. Deformation field and earthquake prone area will be revealed after analyzing and joint-interpreting the data.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>3 years (2008-2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td>DAUM-Izmir, AFAD-Ankara</td>
</tr>
<tr>
<td>Name</td>
<td>Modeling of Seismic Site Response for Earthquake Resistant Structural Design in Izmir Metropolitan Area and Aliaga-Menemen Districts</td>
</tr>
<tr>
<td>Support</td>
<td>TUBITAK-KAMAG (106G159)</td>
</tr>
<tr>
<td>Aim</td>
<td>Acquiring strong ground motion characteristics of geological structures by installing local accelerometer network in Metropolitan Izmir, determining of the basement topography using micro-gravity measurements, revealing site characteristics by using applied geophysics and ambient noise measurements.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>3 days (April 30 - May 2, 2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td>SAMER-Izmir, Department of Geophysics of DEU, Izmir Branch of the UCTEA Chambers of Geophysical Engineers</td>
</tr>
<tr>
<td>Name</td>
<td>Symposium on Geophysics and Remote Sensing in Determination of Near-Surface Structures</td>
</tr>
<tr>
<td>Support</td>
<td>DEU, UCTEA</td>
</tr>
<tr>
<td>Aim</td>
<td>Bringing to practitioners the applying geophysical and remote</td>
</tr>
</tbody>
</table>
sensing techniques, usage extensively in determination of near-surface objects, and contributing the development of communication and transmission of information among researchers working on shallow structures using a multi-disciplinary approach.

**PUBLICATIONS**


**2008:** Gokturkler, G., Balkaya, C. and Erhan, Z., Geophysical investigation a landslide: The Altindag landslide site, Izmir (western Turkey), *J Appl Geophys* 65, 84-96.


f. **ÇANAKKALE ONSEKIZ MART UNIVERSITY DEPARTMENT OF GEOPHYSICAL ENGINEERING**

[http://jeofizik.comu.edu.tr/](http://jeofizik.comu.edu.tr/)
The department was founded in 2001 and developing rapidly. The mission of the Department of Geophysics Engineering to provide an environment in which students can improve themselves according to their interest area and to graduate as geophysical engineers whom are highly regarded by both companies and academic institutions.

Our curriculum is based on the applications related to mining, geological, civil, and environmental engineering and seismology disciplines and on the developing software for geophysical methods. Our undergraduate and graduate programs have been updated in response to developments in geophysics engineering. Our department is in continuous development of its educational and research programs and infrastructure. The department, currently, offers B.Sc. and MSc degrees in geophysics engineering. First graduate and undergraduate degrees were offered in 2001 and 2002, respectively.

The faculty has a dynamic and young structure from diverse fields including mining, civil and environmental geophysics, and seismology. The Department of Geophysics Engineering has run various projects for engineering and environmental problems that have been vital for municipalities. In addition, our staffs participate in international projects.

**PROJECTS**

(ÇOMÜ-BAP) / Geophysical Characterization of Lapseki-Adatepe Landslide Area By Electrical Resistivity and Seismic Refraction Methods

(TÜBİTAK) / Neotectonic and Seismotectonic Characteristics between Simav Fault and Kütahya Fault (Emet-Middle-Western Anatolia)

(TÜBİTAK) / Paleoseismology of Troia Fault

Türkiye’nin Meteorit Çarpma Kraterleri Envanteri: Kraterlerin Morfolojik Özellikleri ve Uydu Görüntüleriyle Bulunması (TÜBİTAK)

**COMPLETED PROJECTS**
g. GAZİ UNIVERSITY EARTHQUAKE ENGINEERING APPLICATION AND RESEARCH CENTER

http://www.mf.gazi.edu.tr

Gazi University Earthquake Engineering Application and Research Center (DEMAR) was established in April 22, 2005 as a center under Gazi University Rectorate.

Aims of the Center:

a) To conduct, promote and coordinate theoretical and applied researches on the sources of earthquakes, their occurrences, their effects on engineered structures and people and the mitigation of seismic risks, to provide
consultancy service and organize scientific meetings, courses and seminars on those subjects,
b) To communicate, cooperate with similar centers in the country and abroad, to assist in the development of courses and programs for graduate studies, to provide and spread the knowledge.

**Fields of Studies in the Center:**

a) To conduct studies aiming to inform the local authorities and the public about the precautions before earthquakes and raise the awareness on those topics,
b) To make researches regarding the planning and conducting of emergency and rescue operations after earthquakes,
c) To develop plans on the probable damages and corresponding precautions in the regions with high earthquake risk,
d) To conduct applied researches on the retrofitting of inadequately engineered problematic buildings prior to the occurrence of earthquakes and on the repair of damaged buildings after the occurrence,
e) To provide consultancy service on the implementation of the retrofitting and repair methods developed by the support of the center,
f) To provide knowledge sharing settings by organizing scientific meetings, courses and seminars regarding studies and researches supported by the center on earthquakes and earthquake engineering
g) To assist in the development of undergraduate and graduate courses and programs for civil engineering departments of the universities and to contribute to the informing of students.

**Mission of the Center**

To carry out multidisciplinary research and development (RD) studies on the earthquake threat, the determination of risk and the mitigation of hazardous effects of earthquakes,

To present the results of these studies and the past experiences for the information and the benefit of researchers, central and local authorities and the public,

To support local authorities on prevention and damage mitigation (risk management), intervention and rehabilitation (emergency management),
preparation and implementation of plans and to carry out the studies on training and informing of the public in a way increasing the awareness.

**Vision of the Center**

The vision of the center is to become the most efficient and most qualified Earthquake Engineering Application and Research Center at national scale as well as to be reputable, well known center with continuous improvement in the cooperation potentials at international arena.

**Some Examples of the Works Carried Out**

1. **Seismic Hazard Map of Turkey and Development of Earthquake Regulations**

   The first act on the mitigation of earthquake damages was issued in July 22, 1944 under the name of “Law Regarding Precautions Before and After Earthquakes”. As required by this law, 4623, there prepared “Seismic Hazard Map” and “Earthquake Specification” in relation to the map for the first time in Turkey by Ministries of Public Works and National Education.

   The developments in engineering seismology, the increase in tectonic and sismotectonic findings as well as the increase in earthquake recordings, Seismic Hazard Maps (1945, 1947, 1963, 1972 and 1996) and Specifications for Structures to be Built in Disaster Areas (1947, 1953, 1962, 1968, 1975, 1996 and 2007) were changed several times. With this study, there compiled the information about the Seismic Hazard Maps and Specifications for structures to be built in disaster areas that were approved by Cabinet Decree and inured. Moreover, there prepared a reference guide for the ones that will work on the upcoming seismic hazard maps and specifications for structures to be built in disaster areas including the basis that the older versions considered during the preparation of maps.

2. **Network of Weak and Strong Ground Motion Records in Ankara Region (ANKARA-NET)**

   With this project, there installed seismic stations to record the weak and strong ground motions in Ankara and its surroundings. It is aimed to contribute to the development of earthquake resistant building techniques by using the ground accelerations during earthquakes and determining the forces that come with earthquake and cause damage in any type of building. Besides, the parameters like
the location of earthquake, magnitude, depth etc are determined to investigate the seismicity/seismic activity of Ankara and its surroundings in a detailed way.

3-Earthquake Hazard and Risk of Ankara Workshop

To put forth the seismic risk state of Ankara with scientific studies, in March 19, 2008 at Gazi University Rectorate Mimar Kemaleddin Hall there organized “Earthquake Hazard and Risk of Ankara Workshop”. Besides, at the panel called “Is Ankara ready for an earthquake?” after the workshop, the current state of Ankara in terms of earthquake, necessary studies to be done and suggestions for the solutions were discussed in a detailed way.

4- Disaster Management and Earthquake Trainings

Our country is a country that is located on one of the most active faults and always had, have and will have the risk of earthquakes. Education occupies an important role in the risk mitigation activities. With the collaboration of related Public Agencies and Institutions, Governorships, Municipalities, Nongovernmental organizations, Private Companies, there carried out training studies on Earthquake and Disaster Management to mitigate the effects of earthquakes, decrease the losses to minimum, to train the informed, conscious and responsible individuals, managers and personals.

5- Disaster and Emergency Plans

“Special Provincial Administration Law” enumerated as 5302, “Municipality Law” as 5393 and “Metropolitan Municipality Law” as 5216 entails special provincial administrations and municipalities to be protected from the natural disasters or to make disaster and emergency plans to mitigate the hazardous effects, to carry out the public education actions, to prepare the necessary equipment and equipages. Our center provides consultancy service for the preparation of Disaster and Emergency Plans that Special Provincial Administrations, Metropolitan Municipalities and other municipalities are obliged to prepare.

6- Repair and Retrofitting Studies

PUBLICATIONS

Pampal, S., Özmen, B., 2007, Türkiye Deprem Bölgeleri Haritalarının Gelişimi, Altıncı Ulusal Deprem Mühendisliği Konferansı, 16-20 Ekim, İstanbul-Türkiye


Koçkar, 2008, Evaluation of Site Conditions for the Ankara Basin of Turkey Based on Seismic Site Characterization, The 14th World Conference on Earthquake Engineering, October 12-17, Beijing, China


Özmen, B., 2009, Türkiye Deprem Bölgeleri Haritaları ile İlgili Bilinmesi Gerekenler, Bayındırlık ve İskan Bakanlığı ile Belediyeler, TAU Yayın no.140, Sayı:41, Mart, sayfa 37-42


Eker, A.M., Akgün, H., Koçkar, M.K., 2010, A Comparison of Local Site Conditions with Passive and Active Surface Wave Methods, The Fifth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics Abstract Book, 24-29 Mayıs, Sandiego, California


Özmen, B., 2010, Deprem Senaryoları ve İstanbul Örneği, e-belediye dergisi, Ocak-Şubat sayısı, sayfa 34-36, ISSN 1306-5343

Pampal, S., Özmen, B., 2010, Konya’nın Depremselliği, Deprem Tehlikesi ve Riskleri, 35.Yıl Jeoloji Sempozyumu, 4-7 Ekim, Selçuk Üniversitesi, Alaaddin Keykubat Kampüsü, Prof.Dr. Halil Cin Salonu, Konya

SÜLEYMAN DEMİREL UNIVERSITY EARTHQUAKE & GEOTECHNICAL RESEARCH CENTER

http://mmf.sdu.edu.tr/bolumler/jeofizik
Earthquake and Geotechnical Research Centre was established in 1996, for the purpose of observing earthquakes, by SDU and Potsdam University. The center has supports in a multidisciplinary earthquake research center providing graduate education in three departments Geophysics, Geology and Civil engineering.

The center has provides seismological observation in lakes region and also has four seismological station with on-line connection in same area.

**Equipment**

- Micro Gravity - Scintrex CG-5
- Elektro Magnetic - Geonics-EM34
- Magnetometer - Scintrex SM5 Cesium NAVMAG
- Multi – electrode Resisitivity- GF Instrument (48 elektrot)
- GPR - MALA
- Ultrasonic P-S - NDT Instruments
- TotalStation - Leica TPS 400
- Spectrometer - Gf Instrument

**PROJECTS**

- Bakırlıtepe TUBITAK National Observatory Station Investigations
- Geotechnical Study of the Municipality of Antalya Storey Car Park
- Geotechnical Study of the Municipality of Isparta Storey Car Park
- Elmali, Eшен Hydroelectric Power Plant Geotechnical Investigations
- Golcuk Naval Base Residential Area Geotechnical Investigations
- Burdur City Centre and the nearby settlement of Conformity Assessment of Environment
- Geotechnical Study of Denizli Province
- Gravity Investigation of Crustal Structure Study on the Aegean Region (Project owner:Dokuz Eylul University).
i. İSTANBUL UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSICAL ENGINEERING

http://www.istanbul.edu.tr/eng/jfm

PROJECTS

*Prof. Dr. Yıldız Altınok
“Tsunami Risk And Strategies For the Europen Region” (TRANSFER), Project Coordinator: Prof. Dr. S. Tinti, (01.10.2006-01.10.2009. European Union 6., İstanbul University)

*Prof. Dr. Oguz Özel
İstanbulda Avrupa Yakası altında Anakaya Derinlik Dağılımını ve S-dalga Hız Yapısını belirleyerek Deprem Yer Tepkisini incelemek Temmuz-2007 – Temmuz-2010. İ.Ü. BAP Project (Project N: 568), Executive

3 Bileşen Sayısal Deprem Kayıt Sistemi Geliştirilmesi
Temmuz-2008–Temmuz-2009. 108Y109 (TÜBİTAK -1002-Projesi), Executive

İzmir Metropolü ile Menemen ilçelerinde Güvenli Yapı Tasarımı için Zeminin Sismik Davranışlarının İncelenmesi. 15 Ocak 2008 - .... TÜBİTAK

İstanbul Deprem Acil Müdahale ve Erken Uyarı Sistemi’nin Kalibrasyonu ve İstasyon Yerlerinin Depreme karşı Yerel Tepkilerinin Belirlenmesi. 2005 – 2007 DPT

*Doç. Dr. Eşref Yağcıkaya

*Doç. Dr. Naşide Özer
Marmara Denizi ve civarında olumsuz depremlerin kaotik özellikleri, İstanbul Universtgy Araştırma Fonu projesi, 585/14082006, 2006 –2007. Executive
PUBLICATIONS


• Alcik H, Ozel O, Apaydin N, Erdik, M., 2009, A study on warning algorithms for Istanbul earthquake early warning system, Geophysical Research Letters, Volume: 36 Article Number: L00B05.


• Dolmaz, MN, 2007, An aspect of the subsurface structure of the Burdur-Isparta area, SW Anatolia, based on gravity and aeromagnetic data, and some tectonic implications, Earth Planets And Space, Volume: 59 Issue: 1 Pages: 5-12.

• Dolmaz, MN; Elitok, O; Kalyoncuoglu, UY, 2008, Interpretation of low seismicity in the eastern Anatolian collisional zone using geophysical (seismicity and aeromagnetic) and geological data, Pure and Applied Geophysics Volume: 165 Issue: 2 Pages: 311-330.


• Gürer, A., Bayrak M, Gurer OF, et al., 2008, Deliniation of weathering in the Catalca granite quarry with the very low frequency (VLF) electromagnetic method, Pure And Applied Geophysics Volume: 165 Issue: 2 Pages: 429-441.

• Sayil, N. ve I. Osmanşahin, 2008, “An Investigation of Seismicity for Western Anatolia”, Natural Hazards, 44, 1, 51-64.

j. YILDIZ TECHNICAL UNIVERSITY NATURAL SCIENCES RESEARCH CENTER

http://www.dogabilimleri.yildiz.edu.tr

VISION:

a- To study multidisciplinary for earthsciences
b- Geological and geophysical geodesyc approaching to internal issues of dynamic earth such as crustal deformations and earthquake, tsunami, subsidence, vulcanoes etc.
c- Geologic and geomorphologic approaching to external issues of dynamic earth such as mass movements, flood, erosion, hydrologic issues, coastal and environmental issues
d- Coastal management
e- Disaster management

MISSION:

a- To establish data bank for studies mentioned above
b- to give a scientific support and contribution to younger scientists
c- to give a contribution to global science
d- presentation of data to international scientific communities with publications, presentations, conferences etc. for criticism, discussion
e- to find domestic and aboard partnership for earthscience projects

k. SAKARYA UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSICS

http://www.jfm.sakarya.edu.tr

Department of Geophysics of the Sakarya University was established in 1997 under the Faculty of Engineering. Following the acceptance of students to the department, teaching for the BSc and MSc degrees in Geophysics commenced in 2001-2002 academic year. Besides the daytime teaching program, the night-time teaching program started in the 2004-2005 academic year and the first graduate degrees were given in the same academic year. PhD degree program in the department was activated in the 2008-2009 academic year.

Presently, academic staff of the department comprises 10 lecturer (as Professor, Assistant Professor and Associate Assistant Professor) and 7 research assistants. In the 2010-2011 academic year 600 undergraduate students (334 in the day-time and 266 in the night-time teaching programs) and 30 graduate students (25 in MSc and 5 in PhD programs) are taught in the department.
The academic activities of the department in the last 4 years are given below.

**PROJECTS**

**RESEARCH PROJECTS (DPT – TÜBİTAK)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Title</th>
<th>Project Coordinator</th>
<th>Researcher(s)</th>
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<td>1</td>
<td>“Sapanca gölünün ayrıntılı batimetrisi, genç çökel istifi, aktif yapısal unsurları vasitasıyla yakın bölgelerin sismojenik davranışının incelenmesi”, Turkish National Geodetic and Geophysical Union, Project Coordinator: Prof. Dr. Levent GÜLEN Araştırmacı: All of the academic staff and research assistants of the Department of Geophysics, Sakarya University</td>
<td>Prof. Dr. Levent GÜLEN</td>
<td>All academic staff and research assistants of the Department of Geophysics, Sakarya University</td>
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<td>2</td>
<td>Kıbrıs ve Civar Bölgelerindeki Deprem Tehlikesinin Tespit Edilmesi TÜBİTAK-109Y346 Supervisor: Prof. Dr. Levent GÜLEN, Researcher: Research Assistant Hilal DOMAÇ</td>
<td>Dr. Levent GÜLEN</td>
<td>Hilal DOMAÇ</td>
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<td>3</td>
<td>Türkiye’nin deprem riski yüksek jeo-stratejik “ancak tektonik rejimleri farklı–bölgerinde deprem davranışının çok disiplinli yaklaşımlarla araştırılması projesi”. TÜBİTAK-TARAL-1007 (Prof.Dr.Ruhi SAATÇILAR)</td>
<td>Prof. Dr. Ruhi SAATÇILAR</td>
<td>Ruhi SAATÇILAR</td>
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<td>4</td>
<td>Soma Tersiyer Havzası’nda Organik Jeokimyasal, Organik Petrografik ve Entegre Sismik Yöntemlerle Kömür ve Kömür Kökenli Doğal Gaz Potansiyeli Araştırılması ve Modellenmesi(GAZPRO). TÜBİTAK-TARAL-1007 (Prof.Dr.Ruhi SAATÇILAR)</td>
<td>Prof. Dr. Ruhi SAATÇILAR</td>
<td>Ruhi SAATÇILAR</td>
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**RESEARCH PROJECTS (FUNDED BY THE SAKARYA UNIVERSITY)**

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<tr>
<td>1</td>
<td>Project No: 2007-01-14-001 Jeolojik ve tektonik süreçlerin fiziksel modellenmesinde oprik tarayıcılar ile ilk denemelerin yapılması“Project Coordinator: Dr. Mehmet Dinçer Köksal, Completed.</td>
<td>Dr. Mehmet Dinçer Köksal</td>
<td>Mehmet Dinçer Köksal</td>
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<tr>
<td>4</td>
<td>Proje Türü: BAP, Proje No: 2010-05-08-006. “Alüvyonlu Zemin Ortamında Deprem Yükleri Altında Doğalgaz Boru Hatlarının Performans Analizi” Coordinator: Dr. Seyhan FIRAT, Researchers: Erkan ÇELEBI, Günay BEYHAN, İlyas ÇANKAYA, Nihat S. IŞIK, İsa VURAL, Osman KIRTEL, Continues.</td>
<td>Dr. Seyhan FIRAT</td>
<td>Seyhan FIRAT</td>
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PUBLICATIONS

(INTERNATIONAL JOURNALS – SCI / SSCI)


(INTERNATIONAL JOURNALS – OTHER)


(NATIONAL JOURNALS)

INTERNATIONAL PRESENTATIONS WITH PUBLISHED PAPERS


NATIONAL PRESENTATIONS WITH PUBLISHED PAPERS

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POPULAR PAPERS

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<tr>
<td>1</td>
<td>Köksal M.D., Bayat, C.</td>
<td>2009, SAU Proje No 2007 01 14 001 - İlk Bulgular, SAU DAYK dergi No 4 - ISSN1307-9727, pp 168-169.</td>
<td></td>
</tr>
</tbody>
</table>
1. KOCAELI UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOPHYSICS

http://jeofizik.kocaeli.edu.tr

The department of geophysical engineering was founded in 1979 under the Kocaeli State architecture-engineering academy. Education started in 1980 in our department. In 1982, the department joined the engineering faculty of Yıldız University. The first student group graduated from the department in 1984. With the establishment of Kocaeli University in 1992, the department became a part of the engineering faculty. Evening program (night schedule) started in 1992. Totally 582 undergraduate students are currently going on their education in our department. The department has greatly been developed with respect to the quality of our academic staff, education, and research facilities since 1979. In Earth and Space Sciences Research Center (YUBAM), our academic personnel successfully continue their research in an effective manner about earthquake, seismology etc. The total number of academic staff working in our department is now 20, including 4 professors, 8 assistant professors, 8 research assistants, and 1 specialist.

Seismic risk of Istanbul and its surrounding area has increased right after the 1999 earthquakes and many speculations have been published in the media about forthcoming events. In order to have enough information about forthcoming earthquakes, a seismic network should be installed and operated continuously via online communication. Researchers at the Research Center of Earth and Space Sciences of Kocaeli University (YUBAM), in cooperation with the scientists from GFZ (GeoForschungZentrum), installed a local seismic network consisting of 25 seismic stations to monitor micro-earthquake activities of the mid-Marmara region and collect information for the next probable large earthquake in this region.
The network which is called ARNET is the densest local network with the highest number of seismic stations in Turkey and covers the districts Yalova-Armutlu-Gemlik and its surrounding areas. It is also the biggest seismic network operated by universities in Turkey with its 25 seismic stations. The map below shows the distribution of ARNET seismic stations. This network was initially set up as a 10-station local network in September 2005 and the number of the stations reached 25 during the years 2006 and 2007. Recently, 15 stations of this network have been connected to the data centre on Umuttepe Campus of Kocaeli University via online communication systems and micro-earthquake activities occurring in the Marmara Region have started to be recorded at our data centre.

The network has many specifications with the most dense and largest number of seismic stations, and one of the stations located in 25 different sites has a borehole seismometer at 100 m depth, 15 broadband seismometers and 10 short period seismometers. In addition, six accelerometers have been installed nearby faults and densely-populated areas in order to monitor acceleration of mid-size and large earthquakes. Since the region being monitored is characterized by geothermal activity and higher tectonic deformation, we have also installed geochemical sensors to the cold and hot water well stations for pressure changes, conductivity, temperature changes and leveling in order to understand the relation between micro-earthquake activities with hydrothermal potential. This observation will enable us to catch some geochemical precursory phenomena noticed prior to some large earthquakes during earthquake prediction studies. These observations will enable us to study possible interactions between earthquakes and the fluids with special focus on earthquake-related pore-pressure variations in geothermal systems. These observations are conducted at 22 different locations of the study area and Bursa city. At each site, different kinds of geochemical parameters are being monitored. Geochemical observations are conducted together with the Kandilli Observatory and Earthquake Research Institute.

Offline and online data is recorded with the updated software at our center (YUBAM), and data processing is automatically and manually realized by our researchers and students. The data obtained by ARNET is used for education and research purposes and conducting different kinds of researches on Seismology. The information and some of the results obtained from ARNET data has been submitted and shared in several international symposiums, workshops and conferences. At present, the data of the network is under process in different scientific studies. Among some of these studies are 3-dimensional seismic tomography, local stress distribution analysis, recognition of seismicity patterns, moment tensor analysis and accurate seismic event location techniques.
Figure 1. Seismic Network of Kocaeli University.

**Working Groups**

- Earthquake Working Group
- Disaster Working Group
- Applied Geophysics and Soil Working Group
- Remote Sensing and Geographical Information System Working Group

**PROJECTS**

- Seismic Microzonation of İzmit and Surrounding of İzmit based on Global Information System (GIS)...
- Determining the Fault and Lineament Structure of İzmit and Surrounding of İzmit by Using Satellite Data...
- Earthquake activity of Yalova and Armutlu Region...
Department of Geophysics of the Karadeniz Tecnic University was established in 1970 under the Faculty of Engineering. Presently, academic staff of the department comprises 15 lecturer (as Professor, Assistant Professor and Associate Assistant Professor) and 6 research assistants.

**Working Groups**

- Applied Geophysics
- Seismology
- Physics Of The Earth’s Interior

**PUBLICATIONS**


**Conference/Symposium**


KAHRAMANMARAŞ SÜTÇÜ İMAM UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF GEOLOGY

http://www.ksu.edu.tr

Kahramanmaraş region, North and East Anatolian fault system which were formed as simply described above are the principal resources of Turkey’s seismic
activity. Therefore, in between 2005-2008 years, an individual project supported by TÜBİTAK was carried out at Kahramanmaraş Sütçü İmam University. In this project, it is aimed to monitor geochemical parameters of spring waters as well as soil radon gas concentrations continuously in Gölbaşi-Türkoğlu and Türkoğlu-Antakya segments of Eastern Anatolian Fault Zone which are serious earthquake sources of Kahramanmaraş city and its surrounding areas. In this purpose, three stations for soil radon gas and three stations for spring water in total six stations were installed to collect some measurable data to examine the relationship between those measured data and the regional seismicity.

After 2007, a micro-seismology network that continuously monitor seismic activity along all the East Anatolian Fault System (DAFS) including Kahramanmaraş and its surroundings has been installed under the scope of TURDEP Project by the Scientific and Technological Research Council of Turkey-Marmara Research Centre (TÜBİTAK-MAM) and the TR Ministry of Public Works and Settlements General Directorate of Disaster Affairs (GDDA). With this network all of the quakes greater than 1 (M_L) can be recorded in the region. Also, a large number of radon gas, GPS and the borehole tilt/strain measurement stations was established along the East Anatolian Fault in this project. All stations located in the area between Sürgü (Malatya) and Reyhanlı (Antakya) districts, has been monitoring under the responsibility of Kahramanmaras Sütçü İmam University.

**o. GENERAL DIRECTORATE OF MINERAL RESEARCH AND EXPLORATION (MTA)**

http://www.mta.gov.tr
. General Directorate of MTA

General Directorate of Mineral Research and Exploration (MTA), which established in 22 June 1935 (Law No 2804), is a Public Corporation with the aim of conducting scientific and technological research on geology and mineral exploration. MTA corresponds to geological survey corporations in the Developed Countries with its task and properties of the researches. MTA, which is an institution tasked with making geological maps and solving the geological problems of Turkey, engages in scientific research related to earthquake and other natural disasters with geological origin since its establishment. MTA constitutes the basic data source for both reduce disaster losses before the earthquake and post-disaster planning and practices in the country with 76 years experience and knowledge of the archive is based on the geological data base and knowledge on active faults.

2. Ongoing Studies by the MTA Today

After the 1999 earthquakes, new projects have been implemented by the General Directorate of MTA with the aim of overcoming deficiencies of geological information infrastructure and active fault, also reducing the damage of the earthquake.

- **Project of Updating the Active Fault Map of Turkey and the Active Fault Data Base Establishment**: The aim of the project, which launched in 2004 and scheduled to be completed in 2011, is updating the Active Fault Map of Turkey, which was published in 1992 with the purpose of more detailed earthquake hazard analysis in the light of present-day knowledge. Active faults on the lands of Turkey are mapped in scale of 1:25.000 and created active fault data base under the project. Active fault maps produced in the project planned to 1:250.000 and 1:1.000.000 scale map with explanatory book for users and publication of 1:250.000 scale maps have started.

- **Projects of Geological Atlas of the Large Fault Zones**: These projects have been enacted by MTA in order to produce the geological maps of the major fault systems in Turkey. Within the scope of this research Geological Atlas of the North Anatolian Fault and East Anatolian Fault, which are the country’s two largest strike-slip fault systems, were completed and published. Preparation of geological atlas of the Ecemiş fault is being carried out between the years 2009 and 2011.

- **Landslide Inventory Maps of Turkey**: In our country, after the earthquake landslide is a natural disaster causes the most life and property lose. Landslide areas also characterized as most effected weak grounds by earthquakes. Project of Landslide Inventory Maps of Turkey, which

* This report has been prepared in accordance with the decisions of TUSA-KDK 1 of 2011 meeting.
initiated to determine landslides across the country and to demonstrate the potential risk of it for use in planning and applications, was completed in 2007. Landslide survey was carried out on the 5547 pieces of 1/25,000 scale sheets and digitized map of landslide units in 2923 sheets under the projects. 1:500,000 scale 18 pieces Landslide Inventory Map of Turkey were published and offered to users at the end of 2009.

- Determining Potential Land Use Studies: In these studies, basic earth science data and properties of natural disaster are investigated to take advantage of regional land use planning. For this purpose, in the region researches are being carried out on topics such as geology, hydrogeology-hydrology, geomorphology, general engineering geology, seismicity, mass movements, determination of flood areas to benefit from planning of land use. In this context, these studies have been completed for 49 cities in Turkey.

- Marine Geology and Geophysics Researches: MTA Sismik-1 Research Vessel, assumed an important role, was made earth science studies for different purposes in all the seas and territorial waters. In this context, projects are prepared with local and foreign universities. Thus, recognition of the seas surrounding the three sides of our country, determination of features and to determine the economically important natural resources are intended. MTA Sismik-1 Research Vessel, to be completed lifetime in 2003, was donated to Istanbul Technical University Faculty of Maritime for use maritime training activities. Under the General Directorate of MTA, the marine seismic surveys carried out in rented boats, and small vessels between the years 2003-2010. Marine research will continue with the MTA-Selen Boats, construction was completed in 2011. By 2015, planned to give a new seismic research vessel, MTA will continue to do research on the shallow and deep seas.

- Investigation of Crustal Structure of Anatolia Northwest with Geophysical Methods: Between 2006-2010, with MTA's proposal and support of Ankara University and Cumhuriyet University, "Investigation of Crustal Structure of Northwest Anatolia with Geophysical Methods" project was carried out. With this aim 1) from gravity studies which done simultaneously together with MT (magneto telluric) measurements studies, adding detailed density distribution map of the region 2) with this data, creating geoelectric models and geodensity models, 3) carried out by the MTA, increase information in the working area of Turkey Regional Gravity Maps project, 4) providing information about geometry of deep faults at the updating “Updating the Active Fault Map of Turkey project” conducted by MTA Department of Geology, 5) by providing lacking information of deep crust structure at the earthquake studies for the researcher, in the international science area increase the competition.

PUBLICATIONS


Emre. Ö., 2010, Active Fault Map of Turkey. 1:250.000 scale Çanakkale (NK 35-10b) Section. MTA 1:250.000, N: 1, 40 s., Ankara, Turkey.

Emre. Ö. ve Doğan, A., 2010, Active Fault Map of Turkey 1:250.000 Scale Ayvalık (NJ 35-2) section. MTA 1:250.000 , N: 2, 32 s., Ankara, Turkey.


http://www.mam.gov.tr/english/YDBE
Earth and Marine Sciences Institute were first established in the year 1983 as Earth Sciences Division of Basic Sciences Research Institute. During the period from its foundation until 1996, it acquired experience and know-how in Earth Sciences and a strong infrastructure was built for measurement and evaluation. From 1996 until today, when it was directly connected to TUBITAK MRC Directorate, it defined its mission and vision in parallel to reorganization of Marmara Research Institute and carried out its studies. In the year 1998, it acquired the status of being a research institute connected to TUBITAK MRC Directorate.

Having the vision of being a Center of Excellence in research on active tectonics and underground resources areas countrywide and in our region and the mission of carrying out applied research in active tectonics and underground resources focusing on social benefit by multidisciplinary approaches based on modeling and measurement and dissemination of information acquired by these researches. It inclined on the earth sciences problems awaiting solutions in the light of the progress in earth sciences in the world.

Emphasizing on being a customer oriented institute, its studies were concentrated on three different areas, namely Earthquake Processes, Geophysical Processes and Geochemical Processes. Its name was simplified to become Earth and Marine Sciences Institute at the start of year 2005.

VISION
To become "A Center of Excellence" carrying out researches in the areas of active tectonics and the underground resources in Turkey and in the Region

MISSION
To accomplish social benefit focused applied researches by multidisciplinary approaches based on measurement, monitoring and modeling in the areas of active tectonics and the underground resources and to provide dissemination of acquired know-how

TARGETS
- To let information acquired through researches oriented toward geologic originating disasters to be used as a basis for disaster preparation planning in order to increase social welfare
- To raise public awareness and authorities on the geological processes related to Medical Geology by conducting multi-disciplinary pioneering researches
- To carry out researches in cooperation with the implementing organizations, on reevaluation of the petroleum and natural gas regions; in order to develop the limited hydrocarbon resources in Turkey
•To increase the number of experienced researchers in Earth Sciences areas where the Institute determines an R&D gap in order to accomplish social benefit focused studies at minimum financial cost to the public

QUALITY POLICY

EMSI conforms to TUBITAK-MRC’s quality and environment policy, as formalized in its EN ISO 9001-2000 Quality Management System and 14000:2004 Environment Management certifications. As a consequence, EMSI ensures maximum benefit to all its stakeholders within Turkey and abroad, competing in the international arena as a pioneer research and technology institute performing applied research based on measurement, computer aided modeling and remote sensing with the target of sustainable progress at information, science and technology with its human resources.

Earthquake Processes:
•Earthquake seismology
•Seismic micro-zonation
•Crustal deformation and structure
•Earthquake risk studies
•Active tectonics

Geophysical Processes
•Seismic, gravity-magnetic, electric-electromagnetic data acquisition and processing
•Marine geophysics and sea bottom characterization techniques
•Geodetic applications

Geologic and Geochemical Processes
•Bio-geochemical and organic geochemical studies oriented towards environment and petroleum studies
•Petroleum, earth gas and coal gas research
•Hydro-geochemical studies
•Quantitative sedimentary basin analysis and modeling
•Medical geology application

Techniques Applied
•Space Geodesy - (GPS, InSAR)
•Remote Sensing
•Geographic Information Systems (GIS) Applications
•Inner earth Imaging Systems
•Deformation Monitoring Methods
•Seismic Modeling
•Tectonic and Geologic Mapping
•Well logs
•Organic Geochemistry and Organic Petrology
•Basin Modeling
LABORATORIES

• Environmental and Petroleum Geochemistry Laboratory (EPGL)
• Active Tectonics Research Laboratory

COOPERATIONS

International
MIT, USA
Univ. of California, Berkeley, USA
Darmstadt University, Germany
CNRS, IPGP, France
Forschungszentrum Jülich, Germany
GEOMAR (Kiel Univ.), Germany
NATO, SACLANTCEN, Italy
Academy of Sciences of Ukraine
GeoEcomar (Romania)

National
General Directorate of Disasters Affairs
General Directorate of Mineral Research & Exploration
Turkish Coal Enterprises
Turkish Petroleum Corporation
Istanbul Metropolitan Municipality
Kocaeli Metropolitan Municipality
Turkish Navy
General Commander of Mapping
Boğaziçi University
Cumhuriyet University
Çukurova University
Dicle University
Dokuz Eylül University
Ege University
Eskişehir Osmangazi University
 Firat University
Hacettepe University
İnönü University
İstanbul Technical University
Süleyman Demirel University
Kahramanmaraş Sütçü İmam University
Yıldız Technical Universit

PROJECTS

• European Plate Observing System (EPOS)

• Site Classification and Risk Evaluation for The Bursa Province

• Processing Russian and European Earth Observations for Earthquake Precursors Studies (PRE-EARTHQUAKES)

• SCHOOL SEISMOLOGY PROJECT (SĠSMOKUL)
  Duration: 18.08.2010 – 17.08.2012

• Multi-Disciplinary Earthquake Researches in High Risk Regions of Turkey Representing Different Tectonic Regimes (TURDEP)
  Duration: 01.11.2005 - 31.11.2010

• Determination of Underground Coal By Applying Integrated Seismic Methods And Investigation of Coalbed Gas Potential of Soma Tertiary Basin
  Duration: 01.03.2009 – 31.08.2012

• Investigation of Possible Active Faults in Istanbul Land Area and Development of Landslide Determination and Monitoring Methodologies by Multidisciplinary Researches in Istanbul Metropolitan Area
  Duration: 01.06.2009-30.05.2012

• National 1MV Accelerated Mass Spectroscopy (AMS) Laboratory

• Upgrading Seismicity Monitoring Infrastructure Capacity in the Sea of Marmara
  Duration: 15.05.2006 - 20.10.2009

• Scenarios For Hazard-Induced Emergencies Management (SCHEMA)
  Duration: 11.11.2007 - 01.07.2010

**ACTIVITIES**

• 23-24 November 2009, Turkish- Japanese Earthquake Workshop, TUBITAK, Gebze, TURKEY

• 12 October 2009, TURDEP Project 8. Workshop

• 22-23 May 2009, TURDEP Project 7. Workshop


• 21 November 2008, TURDEP Project 6. Workshop

• 20 June 2008, TURDEP Project 5. Workshop
•08-09 November 2007, Active Tectonic Research Group - 11. Workshop
•07 November 2007, TURDEP Project 4. Workshop
•15 June 2007, TURDEP Project 3. Workshop
•25-26 January 2007, OECD- GSF Workshop On Earthquake Science and Its Contribution To Society

PUBLICATIONS


Zor E, Sandvol E, Xie JK et al., 2007, Crustal attenuation within the Turkish plateau and surrounding regions, Bulletin of the Seismological Soc. of America, Vol. 97, No. 1, Special Issue: S, Part B, pp. 151-161.


National Papers


International Presentations

• Seyis, C., İnan, S., Yalçın, M.N., Possible Meteorological Effects on Radon Gas in Different Soil Conditions, 6th Dresden Symposium, Hazards-Detection and Management, September 20-24 2010, Dresden Germany


• Dikbaş, A., Akyüz, S., Meghraoui, M., Ferry, M., Yalçınner, Ç., Zabi, C., Karabacak, V., Kiyak, N., Altunel, E., Earthquake history and slip rate of sapanca-Akyazı

• Eyidoğan, H., Geçgel, V., Pabuççu, Z., 3 September 2008 (Mw=5.0) earthquake and triggered earthquake history of Atatürk Dam (Eastern Turkey), International Geo-Hazards Research Symposium, March, 9-11, 2009, İstanbul.


• Polat, G., Özel, N., Tan, O., Ergintav, S., Crustal Anisotropy from local observations in Marmara Region, EGU, April, 19-24, 2009, Vienna.


• İnan, S., Research Infrastructures in support os sustainable development, Slovenian Presidency Conference on Research Infrastructure, March, 5-6, 2008, Brdo.

• İnan, S., Integrated geophysical and organic geochemical approach for coalbed gas potential in the miocene Soma Basin (Western Turkey), Effective Utilization of Coal Resources and Advanced Technologies, TKİ Konferans Salonu, April, 9-10, 2008, Ankara.

• Özalaybey, S., An overview of seismicity of Marmara Sea, Western Turkey, Hi-climb and Beyond, University of Illinois, Urbana-Champaign, June, 12-13, 2008, USA.

• Alparslan, E., Joint analysis of land use capability with topography and land use derived from satellite images in a GIS environment Yalova Province case study, ICGIS 2008, 5th International Conference on GIS, Fatih Üniversitesi, July, 2-5, 2008, İstanbul.


• Tut Haklıdır F. Geothermal geochemistry of western Turkey. 23rd International Applied Geochemistry Symposium, Oviedo University, June 14-19, 2007, Oviedo


• Ergin, M., Özalaybey, S, Aktar, M., Tapırdamaz, M., Selvi, S., Tarancioğlu, A. A high resolution aftershock seismicity image of the 2002 Sultandağ-Çay earthquake (Mw=6.5), Turkey. EGU General Assembly, Austuria Center Vienna, April 15-20, 2007, Viyana.

National Presentations


• İnan, S., Soma Havzasında kömür aramacılığına yönelik sismik yöntem geliştirme ve organik jeokimyasal yaklaşımlarla kömür gazi potansiyelinin araştırılması, Soma Havzası Linyit Rezervlerinin Enerjide Kullanımı Semineri, 16-18 Nisan, Soma.


• Zor, E., Cevher, M., Mengüç, G., Soydabas, M., Bilgic, A., Ayan, E., Özalaybey, S. Kocaeli ilinde zemin sınıflaması ve sismik tehlike değerlendirmeleri çalışmaları, Altıncı Ulusal Deprem Mühendisliği Konferansı, 133-144, 16-20 Ekim 2007, İstanbul.


• Alparslan, E. İstanbul Küçükçekmece Gölü ve etrafındaki jeolojik özelliklerin ve heyelan riskinin Landsat TM, Aster ve ERS-1 uydu görüntülerini ile analizi. Türkiye Ulusal Fotogrametri ve Uzaktan Algılama Birliği, IV. Sempozyumu, İTÜ, Kültür ve Sanat Oditoryumu, 5-7 Haziran, 2007, İstanbul.


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s. HACETTEPE UNIVERSITY FACULTY OF ENGINEERING
   DEPARTMENT OF GEOLOGY

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Research Labs
Prof. Dr. Nezihi CANITEZ Geophysical Data Processing Laboratory
Applied Geophysics Laboratory
Palaeomagnetism Laboratory
Seismology Laboratory
Computational Geophysics Laboratory

PUBLICATIONS

North Marmara Trough architecture of basin infill, basement and faults, from PSDM reflection and OBS refraction seismics, Tectonophysics, 490, 1-14.


Avsar, U. and Isseven, T., 2009. Regional clockwise rotation of the Armutlu Peninsula, Western Turkey, resolved from palaeomagnetic study of Eocene volcanics. Tectonophysics, 475, 415-422.


Taymaz, T., Tan, O. and Yolsal, S., 2008. Recent devastating earthquakes in Turkey and active tectonics of the Aegean and Marmara Seas. Earthquake Monitoring and Seismic Hazard Mitigation in Balkan Countries. NATO Science Series IV Earth and Environmental Sciences, 81, 47-55.


**PROJECTS**


İmren, C., (Araştırmaçı). Marmara Denizi’nde Kuzey Anadolu Fayı’nın kuzey kolu boyunca gelişen gaz çıkıslarının (cold seeps) incelenmesi (Marnaut Projesi; CNRS, İTÜ, CEREGE, LSCE, IFREMER).


The Center was created in November 1997 under the UNDP cost-sharing project "Improvement of Turkey’s Disaster Management System".

Objectives:

To provide consultancy and project support to domestic and international institutions with a multidisciplinary approach for mitigation of natural and manmade disasters.

To organise seminars, training courses, in-service training to officials or to community within the framework of disaster management.

Arrange research, implementation and improvement activities about disaster management.

Organise or assist to organise scientific and professional meetings about disaster management.

NATO Science for Peace Programme, Seismic Arrays in Turkey SfP977484 Science for Peace Programme, SfP977484: National Seismic Arrays in Turkey and

TUBITAK ICTAG1578: Construction of Strong Ground Motion Recording Arrays in Local Areas

Our Center has constructed three strong ground motion arrays in cooperation with General Directorate of Disaster Affairs Earthquake Research Department. A total of 38 ETNA type devices were installed with the support of NATO and TUBITAK.

In this Internet site, site properties and up-to-date earthquake records of stations registered by BYT-NET, DAT-NET, MAT-NET, arrays can be found.

RESEARCH

Current:
• "Strengthening citizen participation in disaster management. Pilot project in Bursa".
• "A feasibility assessment of the amendments required in the existing disaster legislation concerning necessary changes.".
• "Prepare pilot regional plans for disaster management."

Completed:

• A round table meeting in December 1998 and December 1999.
• Turkish-Japanese international workshop on "Recent Earthquakes and Disaster Management in March 1999,"
• Training of GDDA personnel in data management and access application.
• A seminar for the instructors in Civil Defence College about "Training of fire brigades in light search and rescue operation" by Joe Bishop.
• A seminar on citizen participation and social awareness by Joe Bishop.
• A seminar to the related agency personnel about the GIS Applications in Disaster Management in June 1999.
• Earthquake Symposium in March 2000.
• The Third Global Disaster Information Network Conference in April 2000.

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http://portal.firat.edu.tr

Our department was founded in 1977. There are 25 Academic Staff within the department.
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http://www.atauni.edu.tr